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# The essential role of prevention in reducing the cancer burden in Europe: a commentary from Cancer Prevention Europe

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## The potential of cancer prevention

In 28 out of 40 United Nations–defined European countries, cancer is now the leading cause of premature death, and the second most common in the other 12, with a total of 1.93 million deaths and 3.91 million new incident cases in 2018.<sup>1</sup> Those numbers are projected to rise to 2.55 million deaths and 4.75 million incident cases in Europe by 2040, as a result of population aging and growth, representing an overall increase in number of deaths by 32%.<sup>2</sup> Notably, however, these estimates are based on prediction models taking current incidence rates and time trends into consideration, so that preventive actions taken today could change this forecast, i.e., lead to lower than those expected numbers. The cancer cost in 27 countries in the European Union in 2009 was €126 billion, 60% incurred in non-healthcare areas, with almost €43 billion in lost productivity due to early death. Of the 4 cancers studied, lung cancer had the highest economic burden.<sup>3</sup>

Cancer prevention has a broad scope encompassing primary, secondary, and tertiary prevention, and research in this domain ranges from the submicroscopic study of the mechanisms of carcinogenesis to the supramacroscopic analysis of the “causes of the causes,” also known as the social determinants of health.<sup>4</sup> Recent studies from France, the United Kingdom, and Germany have estimated that around 40% of cancers in these countries could be prevented.<sup>5–9</sup> Established means of primary prevention include legislation and policies (e.g., on tobacco, alcohol, or hazardous agents), vaccination programs (e.g., human papilloma

virus or hepatitis B), and education about healthy lifestyles and behaviors (e.g., tobacco, alcohol, diet, and UV exposure), as well as other risk-adapted medical prevention strategies (e.g., tamoxifen or aspirin). By cancer type, a

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proportion of 75% to 100% of all cancers of the lung, cervix, esophagus, oral cavity, melanoma, and stomach in Europe are suggested to be preventable as a consequence of changes in established risk and protective factors; similarly, 25% to 74% of all colorectal, bladder, kidney, liver, uterus, pancreas, and breast cancers are potentially preventable.<sup>10</sup> Primary prevention synergistically benefits other noncommunicable diseases by reducing exposures to shared risk factors, creating healthy environments for current and future generations.<sup>11,12</sup> Secondary prevention or early detection through organized screening programs can significantly reduce mortality from breast, cervical, and colorectal cancers, as well as incidence of cervical and colorectal cancers<sup>13</sup>; however, implementation of secondary prevention in Europe is scattered, as recently assessed.<sup>14</sup> Tertiary prevention refers to care aimed at reducing morbidity, disability, and risk of second primary cancer, as well as at restoring function and improving quality of life and participation in society in people diagnosed with and being treated for cancer. The potential to expand preventive interventions remains large and the evidence base for a number of measures has been summarized in the 4th edition of the European Code against Cancer (ECAC) (<http://cancer-code-europe.iarc.fr/index.php/en/>).<sup>15</sup> The ECAC is an integrated instrument for cancer prevention that informs the general public how to avoid or reduce exposures to established causes of cancers, to adopt behaviors to reduce cancer risk, and to participate in vaccination and screening programs under the appropriate national guidelines. It also acts as a guide to aid development of national health policies in cancer prevention, as has been shown by the adoption of the ECAC proposed structure in the comprehensive National Cancer Plans of several European countries.<sup>16</sup>

## Cancer Prevention Europe

Research is required to provide new evidence-based preventive interventions (including the continued search for additional causes of cancer) and to understand the factors that hamper their implementation within health care systems and in the community. In 2018, the international and multidisciplinary consortium Cancer Prevention Europe (CPE) was created to develop world-class prevention research to be translated into effective cancer prevention guidelines and policies at the national and international level.<sup>10,17</sup> CPE is a consortium of leading European research institutions committed to prioritizing cancer prevention through cooperation between countries and programs in order to ensure a dedicated research agenda with long-term vision, and sustainable funding and infrastructure for such research. CPE will focus on expanding preventive interventions and strengthening cancer prevention in Europe by increasing awareness of the needs, the associated required resources, and reducing inequalities in access to cancer prevention across Europe.<sup>18</sup> CPE will be broad in scope, covering a spectrum of research

from human studies and laboratory science to policy research, as well as dissemination of the best evidence, quality indicators, and practices used. Assessment of the cost-effectiveness of different interventions, in relation to costs of treatment, care, and productivity loss, will be a core component of the initiative. Emphasis will also be placed on the evaluation of the impact of preventive interventions (primary, secondary, and tertiary) and advocacy dimensions of the prevention agenda. The agenda for CPE includes (1) research into optimizing the implementation of known preventive strategies (implementation research), (2) dissemination and research translation to inform policy and practice (advocacy), and (3) the identification of novel risk factors and targets for prevention (improvement and expansion). This agenda will be supported by a range of platforms, networks, and infrastructures and will draw together a wide network of partners. Training and capacity building will be integral to the initiative.

## Cancer Mission for Europe: Now!

Europe is heavily fragmented in all aspects of cancer burden. Cancer incidence varies considerably across European countries, partially due to differing risk factor prevalence and stages of implementation of primary prevention<sup>18</sup>; this is especially evident in the case of tobacco smoking.<sup>19</sup> Even in countries at the forefront of cancer awareness, around 40% of cancers—as shown—could be prevented; instead, numbers continue to rise.<sup>20</sup> Cancer survival and mortality differs between European countries,<sup>21,22</sup> as well as within countries across socioeconomic groups,<sup>23</sup> even in a country of high social welfare such as Denmark.<sup>24</sup> Cancer is not just a common cause of death but often comes with physical suffering for the patient and psychological suffering for patients and their families, not counting the economic burden of €102 per citizen, as estimated in 2009 for the European Union.<sup>3</sup> A Europe-wide cancer prevention mission to strengthen and join forces in primary and secondary prevention, as well as tertiary prevention, diagnosis, and treatment, and palliative care, well-resourced for significant improvements in all regards, is timely and urgently needed to reduce the growing cancer burden in Europe. CPE has been founded to be one of the major drivers of such a mission.

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## Author contributions

The article was drafted by C.E. and J.S. All authors contributed to the writing of this review article and approved its final version.

## Declaration of conflicting interest

The authors declare that there is no conflict of interest.

## Disclaimer

Where authors are identified as personnel of the International Agency for Research on Cancer / World Health Organization, the authors alone are responsible for the views expressed in this article and they do not necessarily represent the decisions, policy or views of the International Agency for Research on Cancer / World Health Organization.

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